

What is claimed is:

1. A method for crystallizing a human beta secretase molecule or molecular complex comprising:
preparing purified human beta secretase in the presence of an inhibitor; and
crystallizing human beta secretase from a solution having a pH of about 3.5 to about 5.5.
2. The method of claim 1 wherein the salt is selected from the group of sodium chloride, ammonium sulfate, magnesium sulfate, lithium sulfate, and combinations thereof.
3. The method of claim 1 wherein the solution has a pH of about 4.0 to about 4.7.
4. The method of claim 1 wherein the solution comprises a buffer having a pK_a of about 3 to about 6.
5. The method of claim 1 wherein the glycol is selected from the group of PEG, PEG-MME, PEG-DME, polyoxyalkylenepolyamines, and combinations thereof.
6. The method of claim 1 wherein the solution further comprises a salt.
7. The method of claim 6 wherein the salt is present in a concentration of about 0.001 M to about 0.5 M.
8. The method of claim 1 wherein the solution includes up to about 40% by weight organic solvent.

9. The method of claim 8 wherein the organic solvent is DMSO.
10. The method of claim 1 wherein the solution further comprises up to about 40% by weight ethylene glycol or glycerol.
11. The method of claim 1 wherein the beta secretase is present at a concentration of about 1 mg/ml to about 80 mg/ml.
12. The method of claim 1 wherein the inhibitor is present at a concentration of about 0.1 to about 10 mM.
13. The method of claim 1 wherein the solution further comprises about 5% by weight to about 50% by weight of a glycol.
14. The method of claim 13 wherein the glycol is a monomeric or polymeric glycol.
15. The method of claim 1 wherein the human beta secretase is isolated from mammalian cells.
16. The method of claim 15 wherein the mammalian cells are CHO-K1 cells.
17. The method of claim 15 wherein the mammalian cells are HEK 293 cells.
18. The method of claim 1 wherein the human beta secretase is isolated from insect cells as part of the Baculovirus expression system.
19. A crystal of beta secretase having the trigonal space group symmetry P3₂21.

20. A crystal of beta secretase comprising a unit cell having dimensions of a, b, and c, wherein a is about 77 Å to about 147 Å, b is about 77 Å to about 147 Å, and c is about 77 Å to about 147 Å; and $\alpha=\beta=90^\circ$, and $\gamma=120^\circ$.
21. A crystal of beta secretase having the trigonal space group symmetry $P3_221$ and comprising a unit cell having dimensions of a, b, and c, wherein a is about 77 Å to about 147 Å, b is about 77 Å to about 147 Å, and c is about 77 Å to about 147 Å; and $\alpha=\beta=90^\circ$, and $\gamma=120^\circ$.
22. The crystal of claim 21 having amino acid sequence SEQ ID NO:1.
23. The crystal of claim 22 having amino acid sequence SEQ ID NO:1, with the proviso that at least one methionine is replaced with selenomethionine.
24. A method of producing human beta secretase, the method comprising expressing the human beta secretase in a mammalian cell line.
25. A method of producing human beta secretase, the method comprising expressing the human beta secretase in an insect cell line.